What are preprints and how do they accelerate science communication?

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Outline

- Scholarly Communication: Why Open Science?
- Preprints
- Preprint popularity on the Rise
- Values of preprints
- Perceived Concerns on Preprinting
- Peer-review
- Final Thoughts

Scholarly Communication: Why Open Science?

- The outputs of scientific research: research articles, reviews, theory manuscripts, methods, data, reagents, and highly trained researchers.
- **Research productivity is increasing** at an unprecedented rate.
- **Technological innovations**, a surge in available computing power, and
- The ease with which digital information is stored and communicated is helping researchers to cross experimentation boundaries, to increase data availability, and to **facilitate the transfer of knowledge**.
- Scientists communicate amongst themselves at conferences, via journal articles, and, increasingly in the life sciences, in preprint manuscripts which have not been subject to journal-mediated peer review.

Preprints

- Preprints are online, freely available (open-access) scientific manuscripts posted by authors on dedicated servers prior to journal-mediated peer review and publication in an academic journal

- Now over 1.3 million preprints on arXiv

- Approximately 40,000 preprints on bioRxiv, the latter representing the work of over 160,000 researchers from more than 100 countries.

- Approximately 70% of bioRxiv articles posted before 2017

were subsequently published in 1,531 journals

Preprint servers make work immediately available to researchers

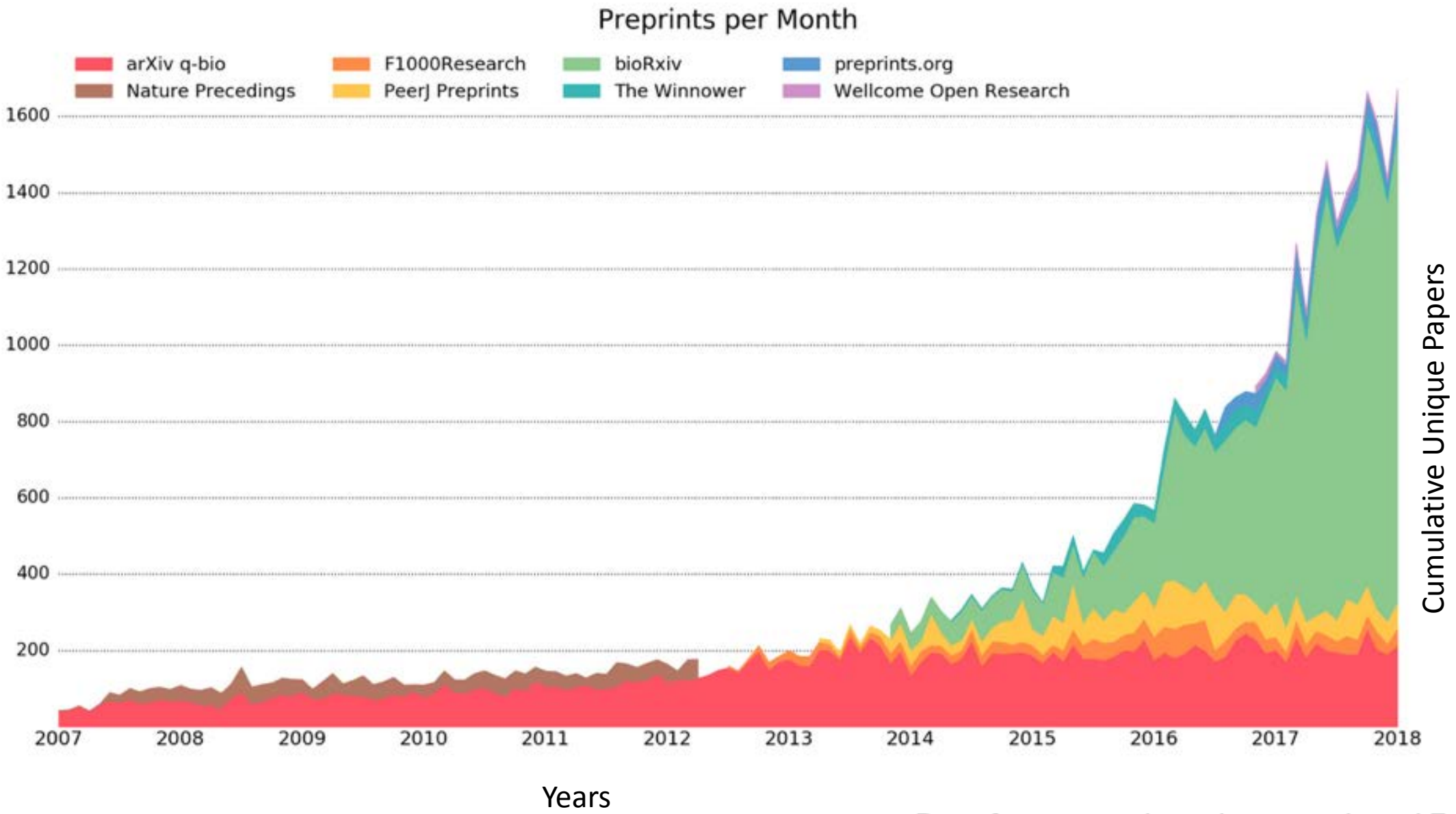
because they do not perform peer review prior to dissemination.

Question for Audience

- Have you heard of/read on/discussed preprints in your lab or department?

- Have you preprinted your work yet or considered preprinting?

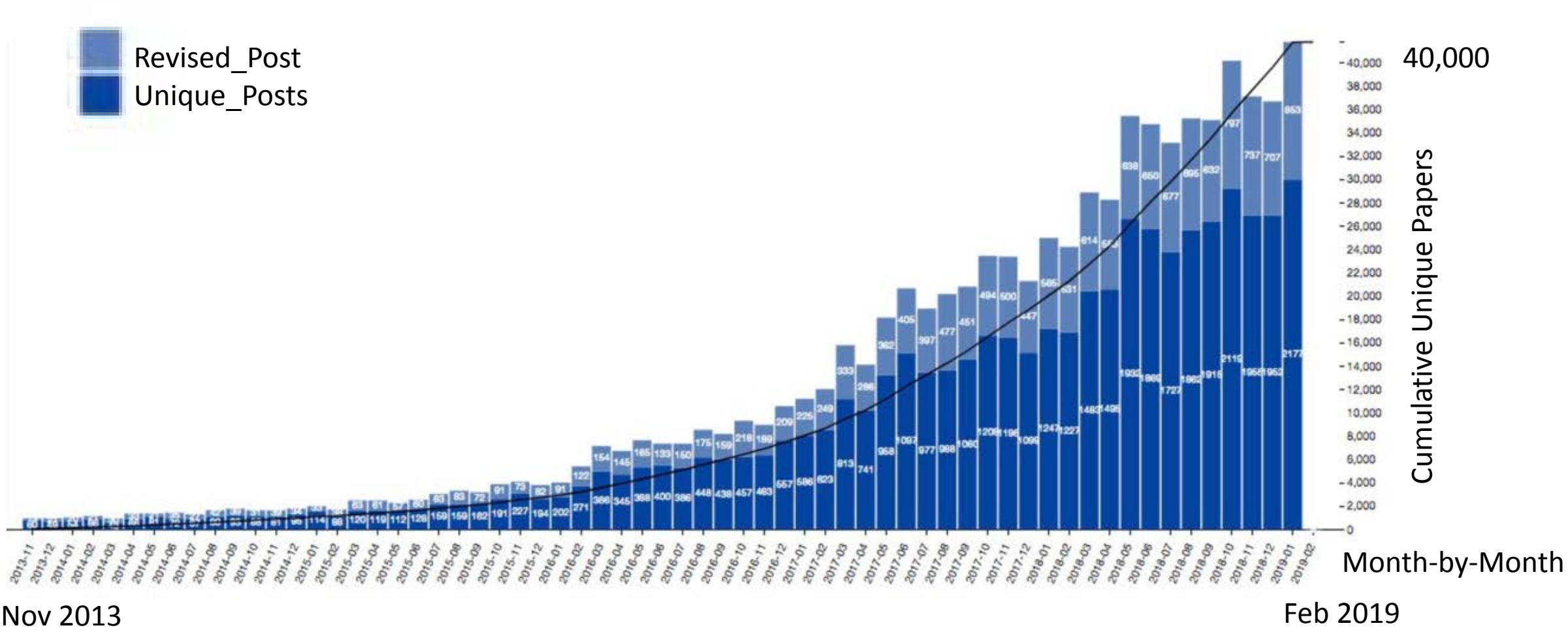
Preprints are becoming popular in Life sciences



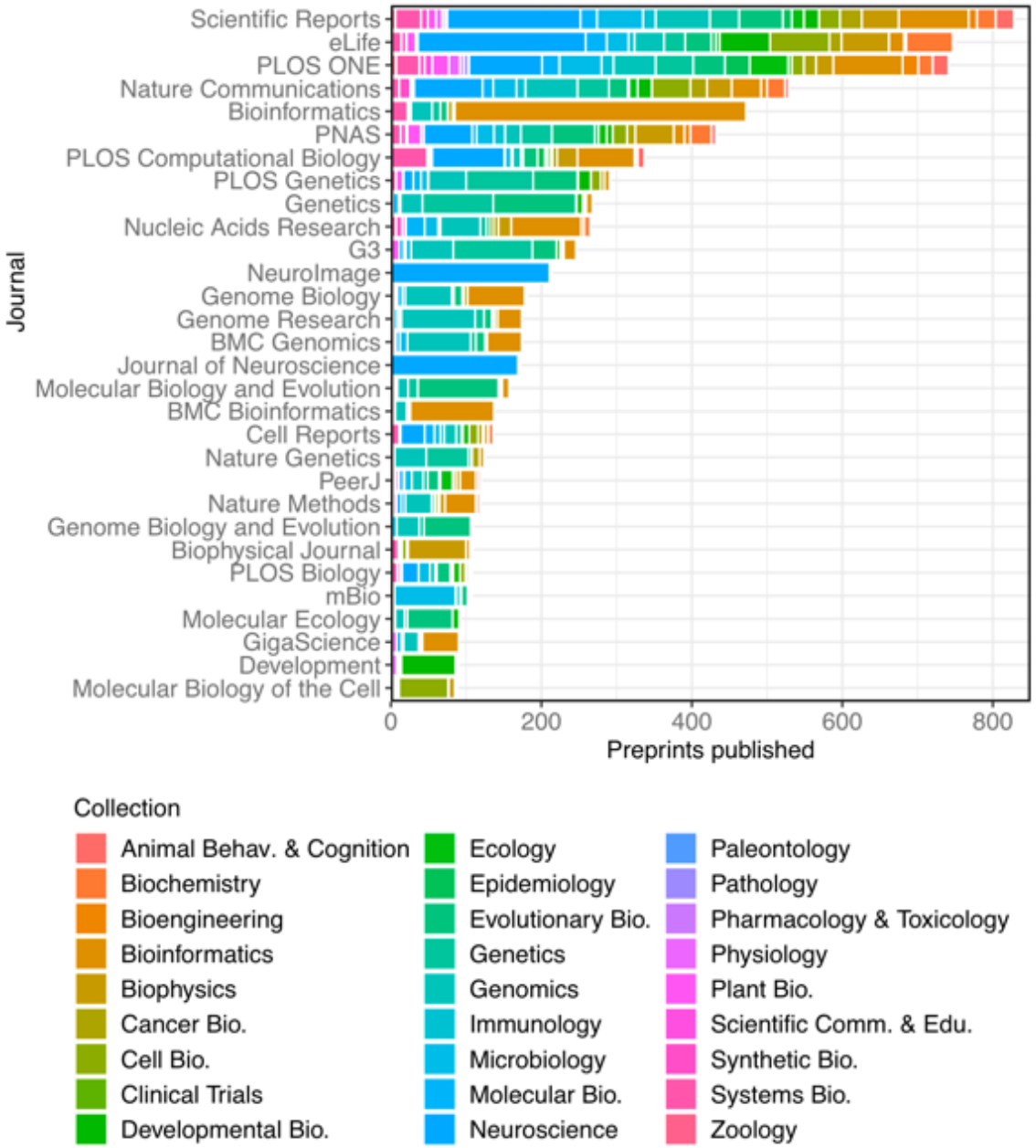
Data from prepubmed.org, retrieved February 20, 2018.

Preprints are becoming popular in biosciences

bioRxiv has had 1.1 million downloads in October 2018 alone



Preprints are becoming popular in all Fields

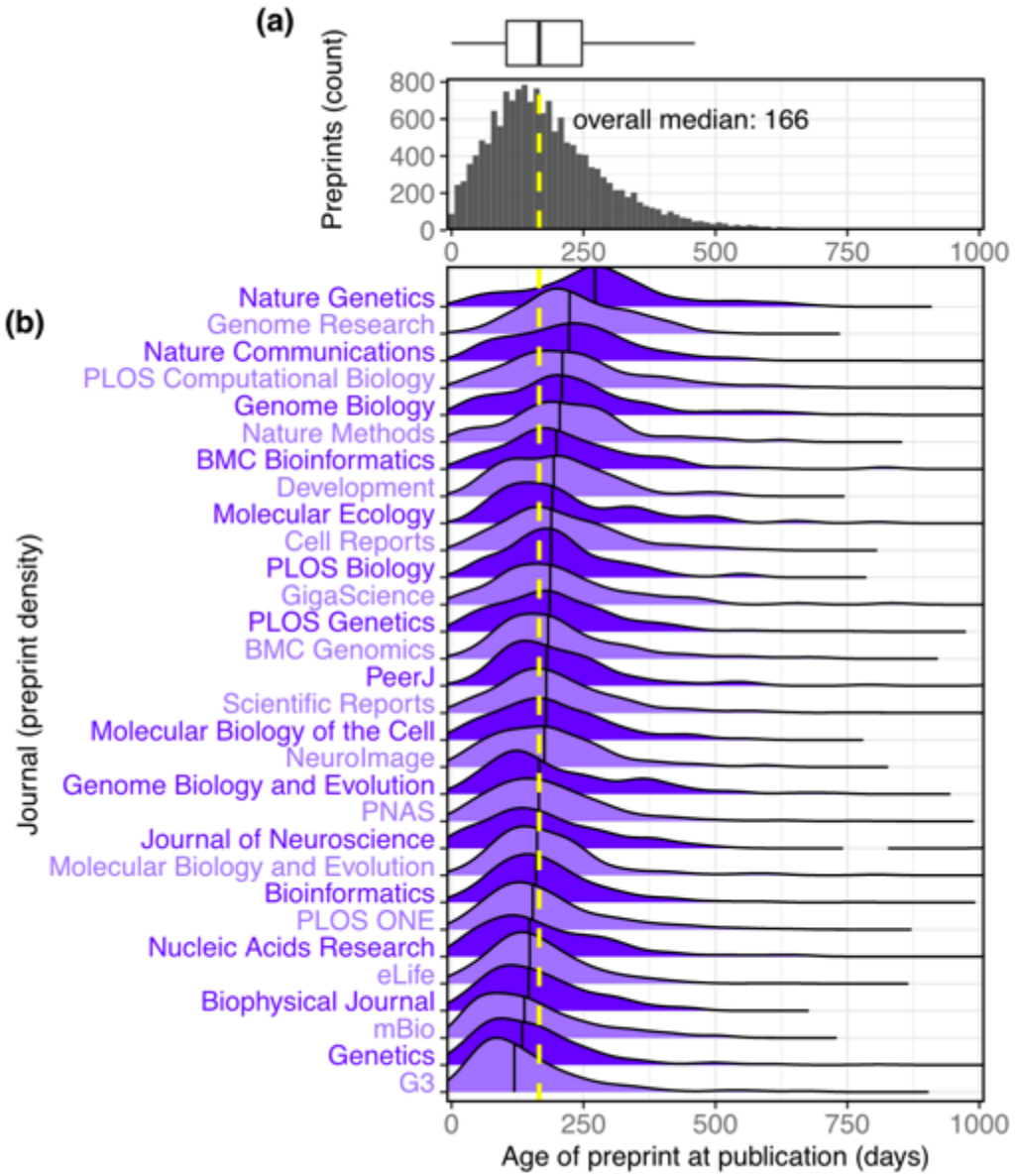


Abdill RJ, Blekhman R. Tracking the popularity and outcomes of all bioRxiv preprints (2019).

Rxivist (pronounced "Archivist"), a website, API and database (available at https://rxivist.org and gopher://origin.rxivist.org)

It provide a fully featured system for interacting programmatically with the periodically indexed metadata of all preprints posted to bioRxiv.

Values of preprints



- Preprints accelerate science communication that facilitates career progression
- Preprints increase visibility and facilitate networking
- Preprints can help ECRs accelerate training time and optimize research design and quality

Sarabipour S, et al. On the value of preprints: an early career researcher perspective. *PLOS Biology* (2019).

Abdill RJ, Blekhman R. Tracking the popularity and outcomes of all bioRxiv preprints. (2019).

Values of preprints

- Preprints allow researcher with limited funds to publish their findings with open access

- Preprints in public health and medical research can boost research

- Preprints can accelerate the peer-review process to make researchers more efficient

Values of preprints

- Preprint reviewing can help ECRs develop their reviewer skills
- Preprints helps researchers perform corrections via revisions
- Publishing All research findings and conditions in preprints can benefit both authors and scientific community

Got Negative Results?

Publish it all as preprints ☺

C&EN - American Chemical Society

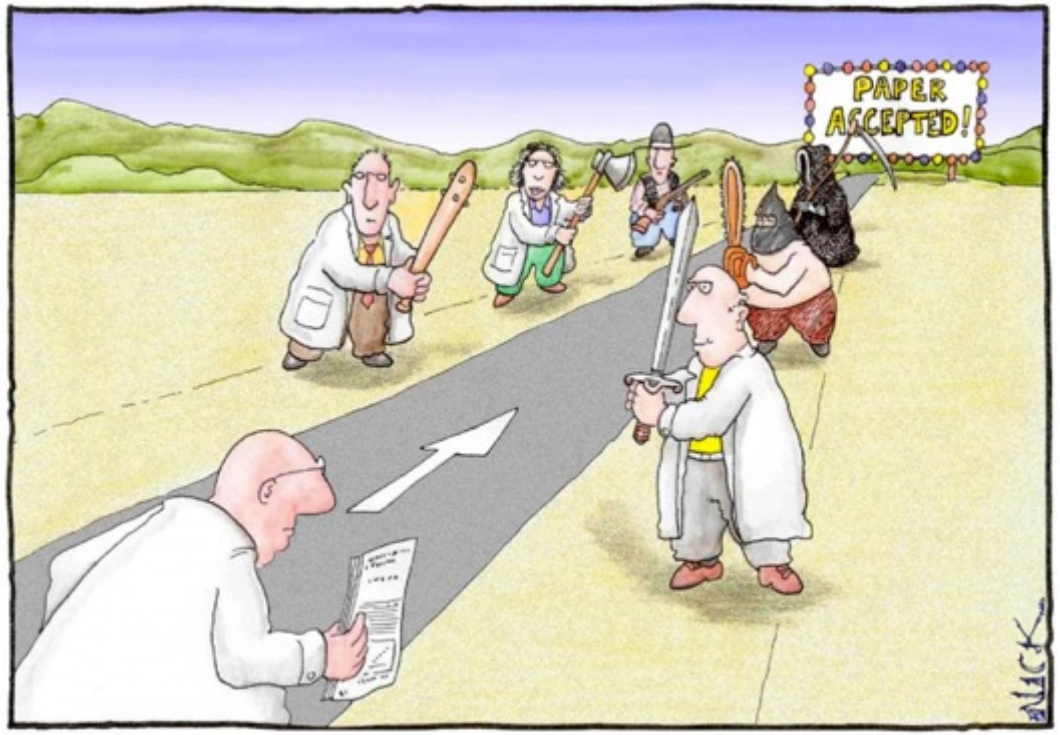
Sarabipour S, et al. On the value of preprints: an early career researcher perspective. *PLOS Biology* (2019).

Perceived Concerns on Preprinting

- “Preprinting leads to scooping.”
- “Preprinting prevents publication.”
- “Preprints have low visibility.”
- “Preprints disseminate unverified knowledge”

Peer-review?

- Peer-review on average takes 5-6 months .
- Threats to scientific reporting cannot be solved solely by peer-review.
- Peer-review leads to long delays between submission and publication, with cycles of rejection, revision, and resubmission causing redundant peer review.
- The history of publishing has shown that peer review does not necessarily guarantee scientific integrity or rigor.



Most scientists regarded the new streamlined peer-review process as "quite an improvement."

1. Wakefield AJ, et al (1998) Ileal-lymphoid-nodular hyperplasia, nonspecific colitis, and pervasive developmental disorder in children. *The Lancet* 351, P637-641.

2. Taylor LE et al. (2014) Vaccines are not associated with autism: an evidence-based meta-analysis of case-control and cohort studies. *Vaccine* 32, 3623-9.

3. Ioannidis JPA. Why Most Published Research Findings Are False. (2005) PL*OS Medicine* https://doi.org/10.1371/journal.pmed.0020124

Final Thoughts

- Preprints have provided a fast, economic, open access route to publishing.
- The benefits of preprint outweigh concerns.

Rxivist
TRENDING OPEN SCIENCE

Rxivist combines preprints from bioRxiv with data from Twitter to help you **find the papers being discussed** in your field. Currently indexing **43,455 bioRxiv papers** from **195,770 authors**.

- Preprint peer-review journals clubs are important events that help train researchers on good peer-review practices.

PREreview

- Local preprint advocacy can help clarify the ambiguity around preprinting.
- **PREreview** (Post, Read, and Engage with preprint reviews) provides a centralized hub in which participants of scientific journal clubs can share their feedback about preprints with other groups.

Further reading

- ASAPbio. We Support Preprints. Available from: https://wesupportpreprints.wordpress.com/.

- Sarabipour S, Wissink EM, Burgess SJ, Hensel Z, Debat HJ, Emmott E, Akay A, Akdemir K, Schwessinger B. Maintaining confidence in reporting of scientific outputs. *PeerJ Preprints* (2018) Issue e27098v1.

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- Sarabipour S, Debat HJ, Emmott E, Burgess S, Schwessinger B, Hensel Z. On the value of preprints: an early career researcher perspective. *PLOS Biology* (2019) DOI is: 10.1371/journals.pbio.3000151.

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- Desjardins-Proulx P, White EP, Adamson JJ, Ram K, Poisot T, Gravel D. The Case for Open Preprints in Biology. PLoS Biol. 2013;11(5):5.